

# **The Joint National Oceanic and Atmospheric Administration's (NOAA) National Weather Service (NWS) and the United States Geological Survey (USGS) Debris Flow Warning Systems**

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Landslides and debris flow cause loss of life and millions of dollars in property damage annually in the United States. In an effort to reduce loss of life by debris flows, in 2005 the National Oceanic and Atmospheric Administration's (NOAA) National Weather Service (NWS) and the United States Geological Survey (USGS) formed a task force to assess the feasibility of establishing a demonstration debris flow early warning system for recently burned areas in Southern California, and to identify the necessary scientific advancements and costs associated with the expansion of such a system to unburned areas and, eventually, to a national scope.

That task force found that it is feasible for a demonstration debris flow warning system to be instituted for recently burned areas in southern California. Debris flows are common following wildfires in this setting, and representative rainfall intensity-duration thresholds for debris flow occurrence have been developed for parts of the region. The demonstration project covers an eight-county area, and is based on the existing NWS operational Flash Flood Monitoring and Prediction (FFMP) system. FFMP was modified to identify when both flash floods and debris flows are likely to occur based on comparisons between radar precipitation estimates and established rainfall intensity-duration threshold values. FFMP provides the most cost-effective and expedient approach to implement a warning system on a 24 hour, 7 day a week basis. Advisory outlooks, watches, and warnings will be disseminated to emergency management personnel through the Advanced Weather Information Processing System (AWIPS). The task force also recommended that a smaller area within the larger demonstration area be dedicated to intense instrumentation and research to enhance and develop new geologic, hydrologic, and hydrometeorologic methods for precipitation and debris flow forecasting precipitation measurement techniques. Although considerable potential exists for enhancing and expanding the warning system to provide spatially and temporally explicit information specific to debris-flow processes in unburned settings, significant resources and scientific advancements are necessary to realize this potential.

Finally, the presentation will cover the performance of the prototype warning system to date, and the possibilities of applying it in other countries.